The Ulster Medical Journal, Volume 67, No. 1, pp. 41-43, May 1998.

Audit of the management of spontaneous pneumothorax

P A Courtney, W R McKane

Accepted 1March 1998

SUMMARY

This audit suggests that clinical practice in the management of spontaneous pneumothorax differs from guidelines issued by the British Thoracic Society. In particular simple aspiration was attempted in only seven out of 65 patients and clamping of an intercostal chest drain occurred in 12 out of 50 cases. Junior medical staff require more training in intercostal drainage.

INTRODUCTION

In July 1993 the British Thoracic Society (BTS) issued guidelines for the management of spontaneous pneumothorax[1] which stimulated much dis-cussion, and it was suggested that they could be used as a basis for audit. We performed such an audit in a district general hospital with no resident respiratory physician or thoracic surgeon. Patients with a diagnosis of spontaneous pneumothorax were admitted to a general medical ward under the care of the consultant physician on call. A specialist respiratory centre including a thoracic surgery department is located within eight miles of the hospital where the audit was performed.

METHOD

The cases were identified from the coded diagnosis of spontaneous pneumothorax, and information was recorded on a detailed proforma. We found 65 cases in the designated time period between April 1994 and April 1996. It was predicted that a hospital with a catchment population of 200,000 would treat 25 such patients each year so our figure of 65 for a two year period with a catchment of 270,000 is typical. The auditors examined the casenotes and radiographs of each patient.

OBSERVATIONS

Of the 65 patients, 49 had their first pneumothorax, 10 their second, four their third and two were admitted with a fourth pneumothorax. There was no history of underlying disease in 40 cases. The pneumothoraces were small in 26 cases and required observation only. The remaining 39 patients were treated by a drainage procedure.

Simple aspiration had been attempted in only seven patients. It was successful in only two cases and the other five eventually were treated by intercostal drainage. There were no cases of tension pneumothorax. Of 18 patients with no underlying disease who required a drainage procedure only two had aspiration attempted. The majority of these patients had pneumothoraces which would have seemed suitable for aspiration. Of the 19 patients with underlying lung disease who required a drainage procedure aspiration was attempted in five cases.

There were 37 patients who required intercostal drainage, and with re-siting a total of 50 chest drainage procedures were performed. There was no example of delaying a procedure until a more experienced person was available. There was no documentation of trocar-use, and all drains were inserted in the triangle of safety. This is bounded anteriorly by the posterior pectoral fold, posteriorly in the mid axillary line and inferiorly a horizontal line from the nipple approximates to the level of the diaphragm. In the group of 37 patients treated by intercostal drainage 27 were successful; 23 that were associated with a clinical problem. In 13 of these cases there was either persistent air leak or failure of the lung to expand despite an adequate chest drain, and thoracic surgery referral was necessary. The remaining 10 drains were either inadequately positioned or

Department of Medicine, Ulster Hospital, Dundonald, Northern Ireland.

W R McKane, MD, FRCP, Consultant Physician.

Department of Medicine, Royal Victoria Hospital, Belfast.

P A Courtney, MRCP, Specialist Registrar.

Correspondence to Dr McKane.

subsequently lost their position. One of these cases was associated with severe subcutaneous emphysema.

Only a minority of chest drains were inserted by physicians despite all cases eventually being admitted medically. Of the 10 drains that were inadequate all were inserted by SHOs (surgical 5, A and medical 1 and 2 not specified.) In 32 cases local anaesthetic cover only was given during intercostal drainage (18 of these had underlying lung disease and 14 did not.) Opiate analgesia was given to 13 patients in addition to local anaesthetic. One patient had midazolam and local anaesthetic, 2 patients had all three (opiate, midazolam and local anaesthetic.) Respiratory distress with severe breathlessness and hypoxia occurred in 14 cases, all of whom had underlying disease. Midazolam was not given to any patients with respiratory distress. There was no recorded incidence of premedication with atropine.

Suction was applied in seven cases to attempt reinflation but was not successful. Clamping was performed in 12 of the 50 drains.

There were 15 patients referred to thoracic surgery for further management. Of these, 12 cases were accounted for by either persistent air leak or failure of the lung to re-expand despite an adequately-sited chest drain. The remaining three consisted of two patients with their third pneumothorax and one patient with a fourth. Twelve patients had a surgical procedure performed, with equal numbers having pleurodesis and pleurectomy (plus or minus bullectomy or oversewing of bullae). One patient was managed successfully with an additional chest drain and the remaining two consisted of one patient who died of bronchopneumonia and another who was in the third trimester of pregnancy. She was managed with a flutter valve, and surgery was deferred until after delivery.

Only seven patients were not followed up and all those who left hospital with a residual pneumothorax were reviewed at least once.

COMMENTS

The publication of the BTS guidelines was associated with some controversy and it is useful to observe how closely clinical practice is adhering to the recommendations. We feel that our results are likely to be typical of other district general hospitals but this will require verification. An audit of the initial management of spontaneous pneumothorax performed in a large Scottish teaching hospital showed similar findings with regard to a low rate of attempted aspiration and the practice of clamping.[2] The BTS guidelines commented that "it is common for intercostal tubes to be inserted by inexperienced junior doctors, to fit poorly, to leak, and to become dislodged or infected; there is continuing confusion about suction, clamping, management of surgical emphysema and when to seek specialist advice."[1] Simple aspiration was advocated strongly as an effective and well tolerated treatment for spontaneous pneumothorax. It is desirable because there is less associated morbidity than with intercostal drainage and if successful is associated with a shorter hospital stay and a more rapid return to work. Despite this continuing evidence for the effectiveness and convenience of simple aspiration [3,4] it was rarely performed. This may be due to a less successful experience with simple aspiration in practice than has been suggested.

There was a strong negative reaction to the use of trocars following the BTS guidelines[5] and blunt dissection was performed in all cases in this series. It is widely accepted that the clamping of chest drains is a dangerous practice,[6] potentially converting simple pneumothoraces to life threatening tension pneumothoraces.[7] It is alarming that 12 out of 50 drains were clamped. This audit would appear to support the impression that the application of suction is of little value outside specialist centres. If suction is to be used it must be at high volume and low pressure. A low volume pump should not be used as it will not be able to handle a large air leak and will allow air to accumulate, worsening the pneumothorax.[8]

Attention was also drawn to the fact that an agitated patient may be hypoxic[9] and care should be taken with sedation, especially if the patient has underlying lung disease. This must be balanced against the fact that intercostal drainage is a traumatic and unpleasant experience. It was appropriate that midazolam was not administered to patients with respiratory distress.

We observed that over 75% of intercostal drains were inserted by doctors of SHO grade. It was never recorded if this was under supervision. It is not surprising that all the inadequate procedures were performed by the most junior staff. The referrals to thoracic surgery seemed appropriate in all cases.

RECOMMENDATIONS

It would be useful to see data from other comparable hospitals and indeed from those with a respiratory specialist on site. On the basis of this audit we would recommend that aspiration should be more commonly performed, especially in patients without underlying lung disease. It should be emphasised that chest drains should not be clamped and suction avoided outside specialist centres. It may be possible in non urgent situations to delay intercostal drainage until a more experienced doctor is available. Simple aspiration is much less likely to be successful in patients with underlying lung disease[10] and it could be argued that this group of patients should be managed by intercostal drainage in the first instance. We have noted that spontaneous pneumothorax is initially more often managed by surgeons than physicians in our hospital which raises the additional controversy of whether or not it should become a surgical admission. The practice of blunt dissection is certainly more familiar to surgeons than physicians. The subsequent management of patients with underlying lung disease may be more appropriate in a medical unit or one with a medical input, but patients with primary spontaneous pneumothorax could be admitted surgically. If spontaneous pneumothorax is to continue as a medical admission junior medical staff should receive more formal training in the procedure of intercostal drainage.

REFERENCES

1. Miller A C, Harvey J E. Guidelines for the management of spontaneous pneumothorax. *Br Med J* 1993; **307**:114-6.
2. Selby C D, Sudlow M F. Deficiencies of management of spontaneous pneumothoraces. *Scott Med J* 1994; **39**: 75-7.
3. Harvey J E, Prescott R J. Simple aspiration versus intercostal tube drainage for spontaneous pneumothorax in patients with normal lungs. *Br Med J* 1994; **309**: 13389.
4. Andrivet P, Djedaini K, Teboul J L, et al. Spontaneous pneumothorax. comparison of thoracic drainage vs immediate or delayed needle aspiration. *CHEST* 1995; **108**: 335-9.
5. Haggie J A. Management of pneumothorax, chest drain trocar unsafe and unnecessary. *Br Med J* 1993; **307**: 443.
6. Wong P S. Never clamp a chest drain. *Br Med J* 1993; **307**: 443.
7. Hariss D R, Graham T R. Management of intercostal drains. *Br J Hosp Med* 1991; **45**: 383-6.
8. Weeden D, Smith G H. Surgical experience in the management of spontaneous pneumothorax. *Thorax* 1983; **38**: 737-43.
9. Hewitt S. An agitated patient may be hypoxic. *Br Med J* 1993; **307**: 443.
10. Light H W. Management of spontaneous pneumothorax. *Am Rev Respir Dis* 1993; **148**: 245-8.